

**What is claimed is:**

1       1. A system of automatic beam energy control,  
2 comprising:

3             a substrate holding apparatus, holding a substrate;  
4             a measurement apparatus, measuring thickness and  
5             hydrogen content of the substrate; and

6             a comparing apparatus, providing a database further  
7 comprising critical hydrogen content limits and  
8 appropriate beam energy levels for substrates of  
9 different thicknesses, allowing determination of whether  
10 a measured hydrogen content value exceeds a critical  
11 hydrogen content limit, providing an appropriate beam  
12 energy level accordingly; and

13             a energy beam apparatus, delivering beam energy to  
14 the substrate accordingly.

1       2. The system as claimed in claim 1, wherein the  
2 measurement apparatus utilizes ellipsometry.

1       3. The system as claimed in claim 1, wherein the  
2 comparing apparatus issues a warning or alarm when  
3 hydrogen content exceeds a critical hydrogen content  
4 limit.

1       4. The system as claimed in claim 1, wherein the  
2 comparing apparatus instructs the measurement apparatus  
3 to measure thickness when the hydrogen content does not  
4 exceed the critical hydrogen content limit.

1       5. The system as claimed in claim 1, wherein  
2 hydrogen content is calculated in accordance with the

3       relationship between a light extinction coefficient and a  
4       bandgap of the substrate.

1           6. The system as claimed in claim 1, wherein  
2       thickness is calculated in accordance with a refractive  
3       index of the substrate.

1           7. The system as claimed in claim 1, wherein the  
2       substrate comprises amorphous silicon.

1           8. The system as claimed in claim 7, wherein the  
2       database comprises appropriate beam energy levels  
3       required by different thicknesses of amorphous silicon  
4       for reconstitution into crystal silicon.

5           9. A method of automatic beam energy control,  
6       comprising:

7                 providing a substrate;  
8                 measuring hydrogen content of the substrate;  
9                 determining if hydrogen content exceeds a critical  
10                 hydrogen content limit;  
11                 issuing a warning or alarm when hydrogen content  
12                 exceeds a critical hydrogen content limit;  
13                 measuring substrate thickness when hydrogen content  
14                 does not exceed a critical hydrogen content  
15                 limit;  
16                 providing a database comprising a plurality of  
17                 appropriate beam energy values corresponding to  
18                 substrates of different thicknesses;  
19                 the database determining an appropriate beam energy  
20                 level corresponding to the measured thickness;  
21                 and

22           delivering beam energy to the substrate accordingly.

1           10. The method as claimed in claim 9, wherein  
2         thickness is calculated by measuring a refractive index  
3         of the substrate using a reflection meter.

1           11. The method as claimed in claim 10, wherein  
2         thickness is calculated by measuring a refractive index  
3         of the substrate using ellipsometry.

1           12. The method as claimed in claim 9, wherein  
2         hydrogen content is calculated in accordance with the  
3         relationship between a light extinction coefficient and a  
4         bandgap by measuring the light extinction coefficient of  
5         the substrate using ellipsometry.

1           13. The method as claimed in claim 9, wherein the  
2         substrate comprises amorphous silicon.

1           14. The method as claimed in claim 9, wherein the  
2         database is populated by determining appropriate beam  
3         energy levels required by different thicknesses of  
4         amorphous silicon for reconstitution into crystal  
5         silicon.

1           15. A method of automatic beam energy control,  
2         comprising:

3           providing a substrate on a substrate holding  
4           apparatus;  
5           measurement of substrate hydrogen content by  
6           ellipsometry;

7           determining if hydrogen content exceeds a critical  
8           hydrogen content limit using a comparing  
9           apparatus;  
10          the comparing apparatus issuing a warning or alarm  
11          when hydrogen content exceeds a critical  
12          hydrogen content limit;  
13          measurement of substrate thickness by ellipsometry  
14          when hydrogen content does not exceed a  
15          critical hydrogen content limit;  
16          providing a database comprising a plurality of  
17          energy values individually absorbed by  
18          substrates of different thickness;  
19          determining a beam energy value corresponding to the  
20          measured thickness according to the database,  
21          using a comparing apparatus; and  
22          a energy beam apparatus delivering energy to the  
23          substrate accordingly.

1           16. The method as claimed in claim 15, wherein  
2          thickness is calculated by measuring a refractive index  
3          of the substrate.

1           17. The method as claimed in claim 15, wherein  
2          hydrogen content is calculated in accordance with the  
3          relationship between a light extinction coefficient and a  
4          bandgap by measuring the light extinction coefficient of  
5          the substrate.

1           18. The method as claimed in claim 15, wherein the  
2          substrate comprises amorphous silicon.

1           19. The method as claimed in claim 15, wherein the  
2 database is populated by determining appropriate energy  
3 levels required by different thicknesses of amorphous  
4 silicon for reconstitution into crystal silicon.

1           20. The method as claimed in claim 15, wherein  
2 amorphous silicon is reconstitute into crystal silicon  
3 after receiving the beam energy.